

ABSTRACT

5 A microfluidic system has an electroosmotic flow (EOF) pumping means for propelling
fluids through a series of microchannels and selection valves. Pump channels are configured in
groups which may be fabricated singly or in multiple groups onto a substrate. A bubble-free
electric connection joint provides for the application of voltages across pump channels while
simultaneously blocking the passage of fluids through the joint. Bubble-free electrodes are also
provided to prevent electrolysis and bubble formation in or close to the microfluidic channels.
10 The selection valves provide for routing functions within the microfluidic system and can also be
configured to route fluids outside the system. A rate monitoring system is provided for
determining and compensating for system flow rates. In one application the microfluidic system
may be configured to operate as a small volume pipettor or other fluid transport or analysis
device. A pipettor washing device is provided to facilitate complete and accurate delivery of the
target fluid, and a method for completely transferring small fluid volumes to dry surfaces is also
provided. A micro-dialysis jacket is additionally provided for the pipettor system to permit
desalting, pH adjustment, concentration adjustment, and other functions.